

- MERRILL, RUTH E. 1923. Plants used in basketry by the California Indian. Univ. Calif. Publ. Am. Archaeol. and Ethnol. **20**: 213-242.
- MUNZ, P. A. 1959. A California Flora. Univ. of Calif. Press, Berkeley.
- MURPHEY, EDITH. 1959. Indian Uses of Native Plants. Desert Printers, Inc., Palm Desert, Calif.
- ROMERO, J. B. 1954. The Botanical Lore of the California Indians. Vantage Press, New York.
- SCHENCK, SARA M. & E. W. GIFFORD. 1952. Karok ethnobotany. Anthropol. Rec. **13**: 377-392.
- SPARKMAN, P. S. 1908. The culture of the Luiseno Indians. Univ. Calif. Publ. Am. Archaeol. and Ethnol. **8**: 187-234.
- WHITING, A. F. 1939. Ethnobotany of the Hopi. Bull. Museum Northern Ariz. No. 15.
- WITTROCK, MARION & G. L. WITTROCK. 1952. Food plants of the Indians. Jour. N. Y. Bot. Gard. **43**: 57-71.
- WITTROCK, MARION. 1942. Medicines from plants. Jour. N. Y. Bot. Gard. **43**: 76-86.
- WYMAN, L. C. & S. K. HARRIS. 1951. The ethnobotany of the Kayenta Navajo. Univ. New Mexico Publ. Biol. No. 5.
- YANOVSKY, E. 1936. Food plants of the North American Indians, U. S. Dept. Agr. Misc. Publ. No. 237.
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### Phytogeography of *Selaginella douglasii*

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This western North American species has a restricted geographical distribution, being known with certainty only in Washington, Oregon, and Idaho. From time to time it has been attributed to both California and British Columbia, but there seems to be no available evidence that it has ever been found in either of those places. My attention was drawn to this matter by the critical monographic work of Alston (1955), who pointed to certain ambiguities in statements dealing with its geographical range.

According to the classification of Alston & Walton (1938) *Selaginella douglasii* belongs in the subgenus *Stachygynandrum*,

series *Decumbentes*. It was described first as *Lycopodium ovalifolium* by Hooker & Greville (1829), but this binomial was invalid when published because Desvaux had applied it to a different species earlier. In 1831 Hooker & Greville renamed the plant *Lycopodium douglasii*, and it appeared under this name in Hooker's *Flora Boreali-Americana* (1840). Spring (1843), the monographer of *Lycopodium* and *Selaginella*, included it with *Selaginella* as "24. *S. douglasii* (Lyc.) Hook. et Grev.," the "Lyc." standing for *Lycopodium*. Originally Hooker based the species on a collection by David Douglas. One hundred and forty-one years later this plant is known to occur only near the type locality along the Columbia River, and in one disjunct area in northern Idaho, some three hundred miles northeastward.

The reports of *Selaginella douglasii* as a Californian species originated apparently with D. C. Eaton, who in the *Botany of California* (1880) wrote that it occurs "Probably in Northern California." Other later published reports of this nature include those by Clute (1905) who wrote, "It is reported to grow in northern California, Oregon, Washington, and British Columbia." Piper (1906) gave the range as "Washington to California." Piper & Beattie (1915) correctly gave simply, "On wet rocks, local; abundant in the Cascade Gorge of the Columbia River." Maxon in Abrams (1923) gave the range as British Columbia and northern Idaho to California, and Jepson (1923) wrote, "Damp shades, n. Cal.; n. to B. C." Peck (1941) attributed this plant to "Moist rocky slopes in the shade, abundant on the south side of the Columbia River Gorge; B. C. to Calif., east to Idaho." Munz (1959) merely mentioned *S. douglasii* as "reported from n. Calif." The continued ascriptions of *S. douglasii* to California are remarkable because there is no other species of *Selaginella* north of Mexico that resembles *S. douglasii*. D. C. Eaton (1880, p. 350) commented that it is "more like some tropical forms than any of the northern species." There is now strong presumptive evidence that *S. douglasii* oc-

curs not nearer than about 240 miles north of California.

The reports of *S. douglasii* from British Columbia also are remarkably persistent. The first came from Baker (1887), who wrote, "Hab. British Columbia, Oregon, and Washington Territory. A well marked species." Alston (1955) noted that this seemed to have arisen through confusion with the Columbia River, and added, "Hooker wrote 'Columbia, Douglas' on the Kew sheet, and Baker has added 'British.'" It may be observed that the town of Vancouver is on the Columbia River in the state of Washington, while the capital city of British Columbia bearing the same name is situated on the mainland of British Columbia. Hieronymus (1902) attributed *S. douglasii* to "nord-amerikanisch Columbien und in Oregon," presumably referring to the western Canadian province of British Columbia. Another possible cause for ascribing *S. douglasii* to British Columbia may have resulted from confusing it with *S. selaginoides* (L.) Link, which Henry (1915) listed from "Selkirks and Rockies, Ucluelet [Vancouver Island, British Columbia], Ounalashka [Unalaska, Aleutian Islands]." There apparently is no evidence that *S. douglasii* occurs naturally in British Columbia or elsewhere in Canada.

Relevant references to *Selaginella douglasii* include the following:

*Selaginella douglasii* (Hook. & Grev.) Spring, Bull. Acad. Sci. Belg. **10**: 138, 1843; Mém. Acad. Roy. Belg. **24**: 92, 1850.—Eaton (1880, p. 350); Baker (1887, p. 47); Hieronymus (1902, p. 689); Clute 1905, p. 160; Piper 1906, p. 87; Piper & Beattie (1915, p. 14); Maxon (1923, p. 46); Jepson (1923, p. 42); Peck (1941, p. 57); Tryon (1949, p. 422); Alston (1955, p. 238); Munz (1959, p. 23).

*Lycopodium ovalifolium* Hook. & Grev., Icon. Fil **2**: t. 177. 1829, non Desv., 1827. "Hab. In oris occidentalibus Americae septentrionalis. Dom. Douglas."

*Lycopodium douglasii* Hook. & Grev. in Hook., Bot. Misc. **2**: 396. 1831.—"Hab. Near springs in woody places, N. W. Amer-

ica, *Douglas*.—An extremely distinct and well-marked species, which I have never received from any collector except *Mr. Douglas*." (Hook, Fl. Bor. Am. 2: 268. 1940.)

(?) *Lycopodium denticulatum* sensu Wilks, Jour. David Douglas 145, 1914, non Linn.

Type: Abundant in moist places on the hills near Grand Rapids, Columbia River above Vancouver, Sept. 1825, *Douglas* 482.

## WASHINGTON

COWLITZ COUNTY: Kalma, *Hemphill* (K).

SKAMANIA COUNTY: Cape Horn, *Piper* 4965 (ILL, WS); *Suksdorf* 2647 (WS); *T. J. Howell*, June 1887 (MO); Castle Rock (Beacon Rock) *Suksdorf* 8475 (WS); east side of Beacon Rock, near summit, shady rocky situation, *J. W. Thompson*, July, 1956 (WTU).

## OREGON

CLACKAMAS COUNTY: Shady banks of Eagle Creek, May 20, 1928, *J. W. Thompson* 4259 (MO, OSC, WTU); moist fir woods, on logs, mossy ground, etc., Eagle Creek, *M. W. Gorman* 5115 (WTU); Milwaukie, May 1881, *Thomas Howell* (OSC, ILL), *T. Howell* 695 (WS); above Estacada, Aug. 1914, *M. E. Peck* (MO, WTU).

HOOD RIVER COUNTY: Herman Creek trail, Aug. 15, 1915, *L. N. Goodding* (OSC), Aug. 15, 1930, *S. B. Locke* (OSC); Columbia Gorge, Apr. 10, 1943, *Helen M. Gilkey* (OSC); Bridal Veil, Columbia River Gorge, *G. N. Jones* 8767 (ILL, MO); wet rocks, McCord Creek, Columbia River Gorge, *G. N. Jones* 10091 (ILL).

MULTNOMAH COUNTY: Damp shaded rocks near Bonneville, *Suksdorf* 832 (BM, WS); common in mixed forest of *Pseudotsuga* and *Acer*, on rocks and tree trunks, elev. 600 feet, Oneonta Gorge Trail, two miles east of Multnomah Falls, *A. N. Stewart* 7496 (OSC); on mossy basaltic banks, Sheppards Dell, south side of Columbia River, *C. L. Hitchcock* 20110 (WTU); shaded slopes above Wahkeena Falls, Columbia River, *Ivan Buddenhagen* 6 (OSC); on rocks on trail to falls, Wahkeena Falls, Sept. 12, 1951, *L. Jones & F. Nicol* (OSC); on moist sunny cliffs, Cornell Road, Portland, *L. F. Henderson* 1217 (OSC); vicinity of Portland, *William Palmer* 1492 (WTU); Portland, *Godman* 342 (BM); damp shaded bank, McClay Park, Portland, June 15, 1915, *M. A. Flinn* (OSC); rocky places by spring just beyond Corbett, *J. W. Thompson* 2979 (WTU); Multnomah Falls, *J. W. Thompson* 4192 (WTU), 4973a (WTU), 11368 (MO, WS, WTU).

COUNTY UNKNOWN: Columbia River, near spring in wood, *Douglas* (K); abundant in moist places on the hills near Grand Rapids, Columbia River above Vancouver, Sept. 1825, *Douglas* 482 (ex Wilks); banks of the Columbia, *Lobb* (BM); banks of the Columbia River, western Oregon, *T. J. Howell* 245 (MO).

## IDAHO

CLEARWATER COUNTY: Granite cliffs along the Clearwater River, 5 miles south of Orofino, *W. H. Baker* 13979 (ID).

IDAHO COUNTY: Wet sandy soil, South Fork, Clearwater River, *R. J. Davis* 8401 (IDS, WS); on moist rocks in deep shade, about 25 miles west of Elk City on the South Fork of the Clearwater River, *C. L. Hitchcock* 20362 (WTU); Selway Falls, *H. J. Rust* 2595c (ID); on moist cliffs, south side of Selway River, 20 miles southeast of Lowell, *J. H. Christ* 18262 (WS); shaded rock cliff, Selway Falls, *J. H. Christ* 2595 (ID); Selway Falls, *H. C. Aase* 1774 (BM, MO, WS); *Ownbey & Ward* 3131 (WS); Three Devils Camp, *Daubenmire* 4526 (WS); Three Devils Camp Ground, four miles west of Lowell, *W. H. Baker* 14804, 14526 (ID); southeast of Harpster, *Daubenmire* 47144 (WS); on cliffs along Lochsa, one mile east of Lowell, *J. H. Christ* 12081 (ID); rocky cliffs near Deadman Creek on the Lochsa River, *Young* (BM).

NEZ PERCE COUNTY: Moist wooded slopes along the Clearwater River, five miles east of Spalding, *W. H. Baker* 6459 (ID).

## LITERATURE CITED

- ALSTON, A. H. G. 1955. The heterophyllous Selaginellae of continental North America. *Bull. Brit. Mus. (Nat. Hist.) Bot.* **1**: 219-274.
- & J. WALTON. 1938. Lycopodiinae, in F. Verdoorn, *Manual of Pteridology*, pp. 500-506. The Hague.
- BAKER, J. G. 1887. *Handbook of the fern-allies*. London.
- CLUTE, W. N. 1905. *The fern allies of North America north of Mexico*. New York.
- EATON, D. C. 1880. Pteridophyta, in S. Watson, *Botany of California*, **2**: 329-352.
- HENRY, J. K. 1915. *Flora of Southern British Columbia*. Toronto.
- HIERONYMUS, G. 1902. Selaginellaceae, in Engler & Prantl, *Nat. Pflanzenf.* **1**(4): 621-715.
- HOOKE, W. J. 1840. *Flora Boreali-Americana*, vol. 2. London.
- & R. K. GREVILLE. 1829-31. *Icones Filicum*, vol. 2. London.
- JEPSON, W. L. 1923. *A manual of the flowering plants of California*. Berkeley.

- MAXON, W. R., IN L. R. ABRAMS. 1923. Selaginella, in Illustrated Flora of The Pacific States **1**: 46-50. Stanford.
- MUNZ, P. A. 1959. A California flora. Berkeley.
- PECK, M. E. 1941. A manual of the higher plants of Oregon. Portland.
- PIPER, C. V. 1906. Flora of the state of Washington. Contr. U. S. Nat. Herb. **11**: 87.
- & R. K. BEATTIE. 1915. Flora of the Northwest Coast. Pullman.
- SPRING, A. 1843. Enumeratio Lycopodinearum. Bull. Acad. Sci. Belg. **10**: 138.
- . 1850. Monographie de la famille des Lycopodiacees. Mém. Acad. Roy. Belg. **24**: 92.
- TRYON, ALICE. 1949. Spores of the genus Selaginella in North America north of Mexico. Ann. Missouri Bot. Gard. **36**: 413-432, f. 1-32 on pl. 23-30.
- WILKS, W. 1914. Journal of David Douglas. London.
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### Retention of Viability in Lyophilized Spores of the Fiddlehead Fern, *Matteuccia pensylvanica*<sup>1</sup>

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For many years, residents of New Brunswick, Canada, have used young tender rolled fronds of *Matteuccia pensylvanica* as a table vegetable. In recent times, this use has assumed such economic importance that curled fronds are now gathered in the spring as a fresh crop, or are commercially processed either by freezing or canning. There has been no attempt at raising them commercially. Instead, they are harvested with difficulty from their wild habitat in shaded places along rivers and streams, mostly by Indian laborers. Because of the increasing importance of this crop, one of us (R.G.W.) has undertaken to study the propagation and management of these plants on a regularized basis.

<sup>1</sup>Contribution No. 128 from the Research Station, Canada Department of Agriculture, Fredericton, New Brunswick.